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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,974	03/17/2004	Sridhar Gopalakrishnan	1856-38100 (9852.0-02)	5079

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EXAMINER

DOUGLAS, JOHN CHRISTOPHER

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/802,974	<b>Applicant(s)</b> GOPALAKRISHNAN ET AL.	
	<b>Examiner</b> John C. Douglas	<b>Art Unit</b> 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-12 and 14-42 is/are rejected.
- 7) ☒ Claim(s) 8 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/19/04 + 5/24/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1-7, 10-12, 14-21, 24, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore, Jr. (US 6583186) in view of Davis (US 5378348).

5. With respect to claim 1, Moore discloses where a syngas feed is sent to a Fischer-Tropsch synthesis process and the products are separated into at least a light and a heavy fraction, boiling above 650 degrees F, where the heavy fraction is sent to a hydrocracking reactor. Then the hydrocracked product is combined with the light fraction and passed to a hydrotreatment zone that can include hydrocracking, dewaxing, or hydroisomerization catalysts (see Moore, column 3, lines 22-26, column 7, lines 47-53, column 12, lines 7-23 and Figure).

Moore does not disclose separating the Fischer-Tropsch product into 3 fractions and where the hydrocracked product is combined with the intermediate fraction instead of the light fraction.

However, Davis discloses where the Fischer-Tropsch product is separated into a light fraction boiling between C5/320, an intermediate fraction boiling between 320/500 and where the 320/500 fraction is hydrotreated (see Davis, column 4, lines 8-15 and Figure 1).

Davis discloses that subjecting a 320/500 fraction to hydrotreating removes heteroatoms and produces materials useful as diesel and jet fuels (see Davis, column 1, line 65 – column 2, line 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore to include where the Fischer-Tropsch product is separated into a light fraction boiling between C5/320, an

intermediate fraction boiling between 320/500 and where the 320/500 fraction is hydrotreated in order to obtain a material useful as diesel or jet fuel.

6. With respect to claim 2, Moore discloses separating the hydrotreated product to obtain a light fraction, which contains middle distillates (see Moore, column 5, lines 40-63, column 12, lines 15-24 and Figure 1).

7. With respect to claim 3, Davis discloses that optionally all or part of each product stream can be blended in order to make diesel or jet fuels (see Moore, column 2, lines 1-5).

8. With respect to claim 4, Moore does not disclose that the fractionation of the Fischer-Tropsch product and the hydrotreated product occurs in the same fractionator. However, according to *In re Burhans*, 154 F.2d 690 (CCPA 1946), the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. In the instant case, Moore discloses recycling the hydrotreated product to the heavy stream leaving the first fractionation. The difference between the prior art and the claim at issue is the location of where the recycled stream is added and such a difference is a change in order of performing process steps. Therefore, it would have been obvious to modify the process of Moore to include recycling the hydrotreated product to the feed entering the first fractionator.

9. With respect to claim 5, Moore discloses that the fractionation of the Fischer-Tropsch product and the hydrotreated product occur in separate fractionators (see Moore, column 12, lines 8-23 and Figure 1).

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10. With respect to claim 6, Moore discloses that the hydrocarbon synthesis step is a Fischer-Tropsch synthesis (see Moore, column 1, lines 45-46).

11. With respect to claim 7, Moore discloses where the light and heavy streams can be combined with similar fractions obtained from crude oil (see Moore, column 5, line 65 – column 6, line 6 and MPEP 2144.04 IV C).

12. With respect to claim 10, Moore discloses where the second hydroconversion zone is located downstream of the hydrocracking zone (see Moore, column 12, lines 8-23 and Figure 1).

13. With respect to claims 11 and 12, Moore discloses a hydroisomerization step, containing dewaxing catalysts, following the hydrocracking step (see Moore, column 9, lines 23-44).

14. With respect to claim 14, Moore discloses that both the hydrocracking zone and the hydrotreating zone include molybdenum and nickel (see Moore, column 8, lines 40-46 and column 10, lines 35-44).

15. With respect to claim 15, Moore discloses where the hydrocracking zone can comprise Group VIII and Group VI components and where the hydrotreating zone contains nickel-tin (see Moore, column 8, lines 40-48 and column 11, lines 5-6).

16. With respect to claim 16, Moore discloses where the hydrocracking zone comprises a cracking component that is amorphous or a zeolite and where the hydrotreating zone contains a support of alumina or siliceous matrix (see Moore, column 11, lines 2-11).

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17. With respect to claim 17, Moore discloses where the hydrocracking catalyst with an alumina support contains chlorine or fluorine to provide acid functionality and that the hydrotreating catalyst contains an alumina support without the presence of chlorine or fluorine (see Moore, column 10, lines 5-7 and column 11, lines 2-8).

18. With respect to claim 18, Moore discloses where the hydrocracking zone and the hydrotreating zone are contained within a single vessel (see Moore, column 7, lines 53-58).

19. With respect to claim 19, Moore does not disclose where the hydrocracking zone and the hydrotreating zone are part of one continuous bed. However, according to *In re Larson*, 340 F.2d 965 (CCPA 1965), "the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice." Therefore, it would have been obvious to make the dual hydroconversion zones a continuous bed because such an alteration would be merely making the separate catalyst beds a "one piece construction".

20. With respect to claim 20, Moore discloses where the hydrocracking zone and the hydrotreating zones are in separate vessels (see Moore, column 7, lines 58-63).

21. With respect to claim 21, Moore discloses where the heavy fraction has at least 90-wt% boiling above 650 degrees F (see Moore, column 3, lines 22-26).

22. With respect to claim 24, Moore discloses where the heavy fraction includes predominately 20 or more carbon atoms (see Moore, column 3, lines 22-26).

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23. With respect to claim 26, Moore discloses a fraction that has 5-20 carbon atoms and a heavy fraction that contains 20 or more carbon atoms (see Moore, column 3, lines 17-26).

24. With respect to claim 27, Moore discloses where there is a 100 degree F temperature rise in each catalyst bed (see Moore, column 7, lines 9-16).

25. Claim 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Davis as applied to claim 1 above, and further in view of Hamner (US 4943672). Moore in view of Davis discloses everything in claim 1 (see paragraph 5), but do not disclose where the Fischer-Tropsch product is hydrotreated under mild hydrotreating conditions before the fractionation step.

However, Hamner discloses hydrotreating the Fischer-Tropsch product under mild conditions (see Hamner, column 3, line 64 – column 4, line 4).

Hamner discloses that hydrotreating under mild conditions removes impurities without conversion of the higher-boiling Fischer-Tropsch wax (see Hamner, column 3, line 64 – column 4, line 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore in view of Davis to include hydrotreating the Fischer-Tropsch product under mild conditions in order to remove impurities without conversion of the higher-boiling Fischer-Tropsch wax.

26. Claims 22, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Davis as applied to claims 21 and 24 above, and further in view of



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WO 01/59034. Moore in view of Davis does not disclose the boiling range of the light and intermediate streams.

However, WO 01/59034 discloses where the middle distillate boils between 224 and 712 degrees F and has 9 to 17 carbon atoms and where the light fraction has 9 and fewer carbon atoms (see WO 01/59034, page 11, line 4 – page 13).

WO 01/59034 discloses that Fischer-Tropsch products are fractionated to obtain the desired carbon number range for the final fuel product (See WO 01/59034, page 10, lines 20-24).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore in view of Davis to include where the middle distillate boils between 224 and 712 degrees F and has 9 to 17 carbon atoms and where the light fraction has 9 and fewer carbon atoms in order to obtain the desired carbon number range for the final fuel product.

27. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Davis.

28. With respect to claim 28, Moore discloses Moore discloses where a syngas feed is sent to a Fischer-Tropsch synthesis process and the products are separated into at least a light and a heavy fraction, boiling above 650 degrees F, where the heavy fraction is sent to a hydrocracking reactor. Then the hydrocracked product is combined with the light fraction and passed to a hydrotreatment zone that can include hydrocracking, dewaxing, or hydroisomerization catalysts (see Moore, column 3, lines 22-26, column 7, lines 47-53, column 12, lines 7-23 and Figure).

Moore does not disclose separating the Fischer-Tropsch product into a heavy and intermediate fraction and where the hydrocracked product is combined with the intermediate fraction instead of the light fraction.

However, Davis discloses where the Fischer-Tropsch product is separated into a light fraction boiling between C5/320, an intermediate fraction boiling between 320/500 and where the 320/500 fraction is hydrotreated (see Davis, column 4, lines 8-15 and Figure 1).

Davis discloses that subjecting a 320/500 fraction to hydrotreating removes heteroatoms and produces materials useful as diesel and jet fuels (see Davis, column 1, line 65 – column 2, line 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore to include where the Fischer-Tropsch product is separated into a light fraction boiling between C5/320, an intermediate fraction boiling between 320/500 and where the 320/500 fraction is hydrotreated in order to obtain a material useful as diesel or jet fuel.

29. With respect to claim 29, Moore discloses fractionating the second hydroconverted hydrocarbon (see Moore, column 12, lines 8-23 and Figure 1) and Davis discloses where a middle distillate boiling between 320 and 500 degrees F is obtained as a product (see Davis, Table 2).

30. With respect to claims 30-33, Davis discloses blending a jet fuel fraction and a diesel fraction, where the diesel fraction is subject to only one hydroconversion zone (see Davis, column 3, line 61 – column 4, line 19). Also, it would have been obvious to

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blend the products achieved by the prior art in such a way as to achieve a desired product blend.

31. With respect to claim 34, Moore discloses hydrotreating the product leaving the first hydroconversion zone (see Moore, column 12, lines 8-23). Also, it would have been obvious to hydrotreat the fractions before entering the first hydroconversion zone because according to *In re Burhans*, the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.

32. With respect to claim 35, Moore discloses passing the first hydroconverted stream to the second hydroconversion zone (see Moore, column 12, lines 8-23 and Figure 1).

33. With respect to claim 36, Moore discloses where there is a 100 degree F temperature rise in each catalyst bed (see Moore, column 7, lines 9-16).

34. Claim 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Wittenbrink (US 588376).

35. With respect to claim 37, Moore discloses where a syngas feed is sent to a Fischer-Tropsch synthesis process and the products are separated into at least a light and a heavy fraction, boiling above 650 degrees F, where the heavy fraction is sent to a hydrocracking reactor. Then the hydrocracked product is combined with the light fraction and passed to a hydrotreatment zone that can include hydrocracking, dewaxing, or hydroisomerization catalysts (see Moore, column 3, lines 22-26, column 7, lines 47-53, column 12, lines 7-23 and Figure).

Moore does not disclose separating the Fischer-Tropsch product into 3 fractions and where the hydrocracked product is combined with the intermediate fraction instead of the light fraction.

However, Wittenbrink discloses fractionating the Fischer-Tropsch product into a C5 to 500 degrees F stream, a 500 to 700 degrees F stream, and a 700 degrees F and greater stream (see Wittenbrink, column 1, lines 45-50).

Wittenbrink discloses that Fischer-Tropsch products are normally separated into these three fractions (see Wittenbrink, column 1, lines 45-50).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore to include fractionating the Fischer-Tropsch product into a C5 to 500 degrees F stream, a 500 to 700 degrees F stream, and a 700 degrees F and greater stream because Fischer-Tropsch products are normally separated into these three fractions.

36. With respect to claims 38-41, Wittenbrink discloses fractionating the Fischer-Tropsch product into a C5 to 500 degrees F stream, a 500 to 700 degrees F stream, and a 700 degrees F and greater stream. Also, according to *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775 (Fed. Cir. 1985), a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skill in the art would have expected them to have the same properties (see Wittenbrink, column 1, lines 45-50 and see also MPEP 2144.05 I.).

37. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Wittenbrink as applied to claim 37 above, and further in view of Hamner (US

4943672). Moore in view of Wittenbrink discloses everything in claim 37 (see paragraph 31), but do not disclose where the Fischer-Tropsch product is hydrotreated under mild hydrotreating conditions before the fractionation step.

However, Hamner discloses hydrotreating the Fischer-Tropsch product under mild conditions (see Hamner, column 3, line 64 – column 4, line 4).

Hamner discloses that hydrotreating under mild conditions removes impurities without conversion of the higher-boiling Fischer-Tropsch wax (see Hamner, column 3, line 64 – column 4, line 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Moore in view of Wittenbrink to include hydrotreating the Fischer-Tropsch product under mild conditions in order to remove impurities without conversion of the higher-boiling Fischer-Tropsch wax.

### ***Allowable Subject Matter***

38. Claims 8 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

39. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Benazzi (US 2003/0057133 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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